

## APPENDIX VERMIFORMIS CONCEALED IN THE POSTCÆCAL RETROPERITONEAL SPACE.

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IN view of the scant mention in text-books of surgery and anatomy of the anomalous and rare situation of the appendix in the postcæcal retroperitoneal tissue, and the natural inference that the appendix is congenitally absent if at least part of it is not found intimately covered with peritoneum, this case is of interest.

The clinical history of the case presents no unusual features. S. A. M., dentist, male, single, birthplace and residence in Wisconsin, twenty-five years old; alcohol, tobacco, and venery negative; began in February, 1903, to have attacks of abdominal pain, nausea, tenderness localized over appendix area, and moderate distention of abdomen, with irregularity of bowels. Between attacks, patient tired easily, and did not fully recover his health. When seen first, December 6, 1903, with Dr. J. M. Lewis, of Bloomington, Wisconsin, patient was just recovering from an attack which had been more severe than any previously experienced, during which he vomited once. On examination, the appendix area still gave localized tenderness.

The abdomen was otherwise negative, as was the urine. Diagnosis of chronic catarrhal appendicitis was made and operation recommended, in view of the progressively increasing severity and number of attacks, and the patient's failure to recuperate fully in the intervals. The abdomen was opened by the usual muscle-splitting procedure, and the cæcum identified and brought into the wound. The longitudinal bands and ileocæcal junction were easily made out, but no appendix could be seen. (Fig. 1.) Starting at the point where the longitudinal bands should meet, search was systematically made in all directions for any trace of the appendix, without success. Also there were no signs of

a mesenteriolum. The peritoneum was reflected from a point above the point of junction of the longitudinal bands, without any signs of adhesion or other inflammatory products to the wall of the iliac fossa and neighboring viscera, and presented, except for the high reflection of peritoneum and absence of mesenteriolum, pretty accurately the relations after the removal of an appendix.

The cæcum was next raised at a point four or five inches above its lower end, and with the fingers of the other hand surrounding the gut was carefully drawn up, while the fingers palpating the postcæcal area worked downward. When the lower hand reached a point one-half inch above the ileocæcal junction, a small mass was encountered behind and internal to the cæcum. As I followed this mass towards the middle line and upward, it was found to end in a slight rounded enlargement. Following it downward and outward, behind the cæcum, I brought up at the cæcum, at a point where, if continued, the longitudinal bands would meet. I repeated the procedure of tracing the appendix, and definitely identified it. From a point in the angle of the two anterior longitudinal bands, the peritoneum was incised outward to the fossa wall, and the margins separated. With the end of the cæcum elevated, the appendix was isolated and freed and delivered at the opening of this peritoneal wound. (Figs. 2 and 3.) In freeing it, two small vessels only were tied, and there was almost no bleeding. The direction taken by the appendix, beginning at the cæcum with which it was in close relation throughout, was downward and outward, backward and outward, and making an acute angle turn upward and inward to the end above and internal to the ileocæcal junction. The appendix was easily ligated and removed in the usual way, treating the stump by inverting it, and securing it by a purse-string suture. The second peritoneal wound was then closed by continuous catgut suture and the abdominal wound closed with layer sutures.

The part of the appendix removed on inspection was entirely without peritoneal covering, about three inches long, slender, except at the extremity, where there was slight clubbing, distinctly pale, and anæmic looking. On opening the canal, the proximal third was dilated and presented the usual signs of a chronic catarrhal inflammation, while the rest was obliterated except for a distance of one-quarter inch at the extremity, where

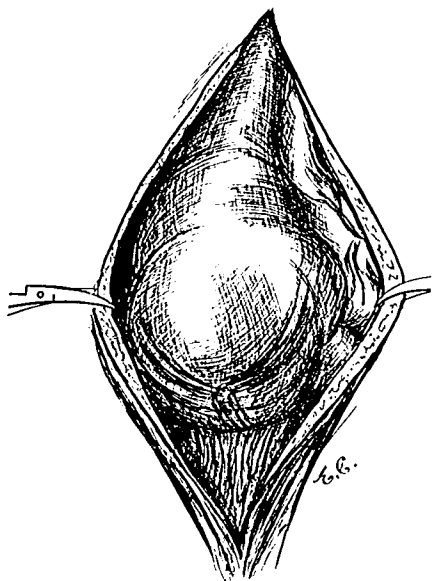


FIG. 1.—Abdomen opened, showing cecum but no appendix.

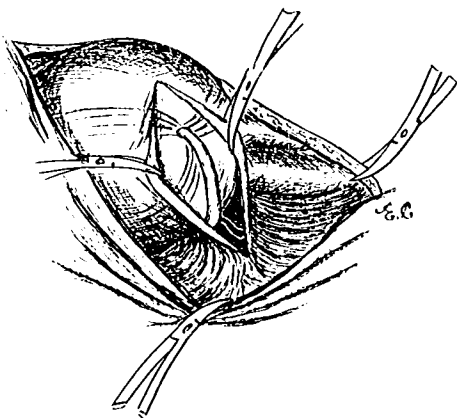


FIG. 2.—Cecum elevated and visceroparietal peritoneum opened, showing appendix and two small vessels.

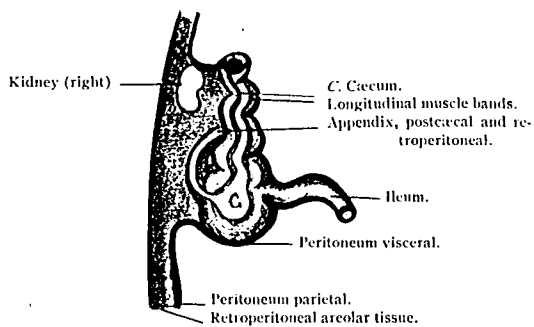


FIG. 3.—Diagrammatic representation of postcaecal retroperitoneal appendix.

dilatation was also present. No concretions were found. Convalescence was satisfactory, and the patient has reported complete relief from symptoms six months after the operation.

In a case of this sort, if one could determine the position of the appendix beforehand, it would not be necessary to open the abdominal cavity to accomplish the removal of the appendix. There seemed to be nothing in the history of the case or the physical signs to point to this anomalous situation.

The importance of investigating the postæcal region where an appendix is wanting in the usual places is apparent from the history of another patient.

Case 2 was taken ill while travelling in the East, and a diagnosis of appendicitis was made. At operation, an intestinal ulcer and diverticulum were found, but no appendix.

The surgeon thus describes the condition: "In the place of the appendix was a continuation of the longitudinal muscular fibres of the bowel as a mere cord, without any adhesions in the region of the head of the cæcum, which one would naturally look for had the appendix sloughed away." He inclined to the belief that the appendix was congenitally absent. This may be, and likely is, a case of fibrous cord appendix.

In view, however, of Case 1 cited above, and the absence of evidence excluding a postæcal position of the appendix, the question whether or not there is an appendix in Case 2 will become all important should symptoms suggesting appendicitis arise in the future.

In the literature on the location of the appendix, Treves<sup>1</sup> states that "it frequently lies behind the cæcum," but does not specify its relation to the peritoneum.

Richardson<sup>2</sup> and Cobb state "it is often retrocæcal," but do not specify in regard to the peritoneum.

Further on they say, "The appendix is sometimes situated in a fossa of the peritoneum behind the cæcum," and again, "It is rarely, if ever, absent."

Gray<sup>3</sup> does not mention a retroperitoneal location, but says it may be found in one of the fossæ about the ileocæcal junction.

Quain<sup>4</sup> states "Sometimes it is entirely behind the cæcum, and in this position may be quite free, or firmly bound down to the peritoneum."

"It has a peritoneal fold, the meso-appendix, containing its vessels and nerves and attached to above half the length of the appendix, the distal portion being generally quite free and entirely surrounded by peritoneum."

Monks and Blake,<sup>5</sup> in a critical review of the autopsy findings of 656 cases in which death occurred from other causes than the appendix, report one case in which the appendix lay "behind peritoneum under cæcum, and extended upward to lower border of right kidney."

McBurney<sup>6</sup> states "The appendix is normally an intraperitoneal organ, except in those cases in which very early adhesion and obliteration of the contiguous peritoneal coverings of the colon and the posterior abdominal wall will have occurred." "It may lie behind the cæcum, or even in the retroperitoneal tissue behind the cæcum, as has been mentioned."

Parker<sup>7</sup> examined seventy appendices in the dissecting-room, and does not speak of a retroperitoneal position.

Boas,<sup>8</sup> citing Bardeleben, Luschka, Tuffier, Maurin, Bryant, and F. von Sydow, says that in more than 96 per cent. of all cases the appendix lies intraperitoneally.

Hartley<sup>9</sup> cites Ferguson's report of seventy-seven out of 200 cases as "having the peritoneum so disposed as to allow an immediate involvement of the subperitoneal tissue by its perforation."

Maurin reports (Hartley) all of his cases as being completely surrounded by peritoneum. He also quotes Kelynnack as asserting that all his cases showed the appendix to be "a truly intraperitoneal organ." Further, Hartley gives it as his opinion "That some of these cases reported as being extraperitoneally placed appendices are only appendices herniated into some of the fossæ at the junction of the ilium and cæcum, or are partly intra- and extraperitoneally placed."

Reviewing the literature as indicated in the Index Medi-

cus and *Bibliographia Medica*, as far back as the time of publication of Monks and Blakes's article mentioned above, I found no reference to this situation of the appendix. More recently V. Bergmann<sup>10</sup> mentions this anomaly as a possibility.

In view of the absence of inflammatory signs, absence of mesenterium, the situation of the appendix as described, and the condition of the appendix as found upon removal, it seems clear we have to deal with a congenital anomaly of position of the appendix. The explanation of the condition, concurred in by Professor Thomas Dwight in a personal communication, is to be sought in the development of the intestinal tract and peritoneum.

Originally in the embryo, the intestine is freely movable and covered by peritoneum, and as the appendix develops from the cæcum it too is covered by peritoneum. Later, during development, certain parts, among which is the ascending colon and sometimes the cæcum, in varying extent, become attached behind by the adhesion and obliteration of the apposing peritoneal surfaces—visceral and parietal.

It is not uncommon to see the upper posterior surface of the cæcum adherent to the posterior abdominal wall, and in the case of a retroperitoneal appendix this process of adhesion and obliteration of apposing peritoneal surfaces has, during development, extended beyond normal limits to such a degree as to involve the appendix by inclusion and obliteration of its peritoneal covering.

Under the circumstances, the mesentery of the appendix also disappears, and its vessels are to be found in the retroperitoneal areolar tissue.

Aside from its anatomical interest, the retroperitoneal appendix may in any individual case have a surgical importance, from the fact that complete congenital absence of the appendix is, indeed, rare; and if one does not at operation readily find the appendix in the abdominal cavity or herniated in the fossæ about the cæcum and ileocæcal junction, one should not conclude that the viscus is absent, until a thorough

and careful search has been made of the postcæcal retro-peritoneal region.

## REFERENCES.

- <sup>1</sup> Treves, F. "Applied Anatomy," p. 343.
- <sup>2</sup> Park. "Surgery by American Authors," Vol. ii, p. 375.
- <sup>3</sup> Gray. "Anatomy." American from thirteenth English Edition, 1893.
- <sup>4</sup> Quain's "Elements of Anatomy," Tenth Edition.
- <sup>5</sup> Monks, G. H., and Blake, J. B. "The Normal Appendix: Its Length, etc." Boston Medical and Surgical Journal, Vol. cxlvii, p. 581, No. 22.
- <sup>6</sup> "International Text-Book of Surgery," Warren and Gould, Vol. ii, p. 396.
- <sup>7</sup> Senn's "Practical Surgery," 1901.
- <sup>8</sup> Boas, L. "Diseases of the Intestine," 1901.
- <sup>9</sup> Hartley, Frank. Dennis' "System of Surgery," 1896, Vol. iv, p. 393.
- <sup>10</sup> V. Bergmann and Bull. "Practical System of Surgery," 1904, Vol. iv, p. 349.